

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated November 14, 2002.

Claims 1-21 and 23-28 are under consideration in this application. Claim 22 is being cancelled without prejudice or disclaimer. Claims 1-21 are being amended, as set forth above and in the attached marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicants' invention. Claims 23-28 are being added to recited other embodiments described in the specification. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Formality Rejection

Claims 4-5, 8-9 and 14-16 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite since they are not drawn to a method for producing a microarray. As indicated, the "f" after "a focus point" in the claims has been deleted. Accordingly, the withdrawal of the outstanding informality rejection is in order, and is therefore respectfully solicited.

Prior Art Rejections

Claims 4-5, 8-9, 14-16 would be allowable if they are rewritten to overcome the 112 rejections and in independent form to include all of the limitations of the base claim and any intervening claims. Applicants have incorporated all the limitations of the base claim and any intervening claims into claims 4-5, 8-9, 14-16 to put these claims in conditions for allowance.

Claims 1-3, and 12-13 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,314,210 to Fukushima et al. (hereinafter "Fukushima"). Claims 6, 10 and 18 were

rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukushima and further in view of U.S. Pat. No. 6,330,111 to Myers (hereinafter “Myers”), claims 7, 11 and 17 as being unpatentable over Fukushima and further in view of U.S. Pat. No. 6,323,999 to Ueda et al. (hereinafter “Ueda”), claims 19-20 as being unpatentable over Fukushima, Myers and further in view of Ueda. and claims 21-22 as being unpatentable over Fukushima, Myers, Ueda and further in view of U.S. Pat. No. 4,329,019 to Okoshi et al. (hereinafter “Okoshi”). These rejections have been carefully considered, but are most respectfully traversed.

The display of the invention, as now recited in claim 1, comprises a projector including a light source array extending at least one-dimensionally or two-dimensionally for providing an input image composed by a luminous input flex emitted therefrom, an illumination lens through which the luminous input flex emitted from the light source array passes, a light valve formed and positioned relative to the illumination lens and the light source array to **pass** the luminous input flex passed through the illumination lens therein, and a projection lens for projecting the luminous input flex modulated at the light valve; and a screen for displaying a projected image composed by the luminous input flex projected by the projection lens of the projector, said projected image being a duplicate of the luminous input flux with a higher and more uniform luminance. The light valve of the projector is located roughly at a focus point of the illumination lens.

The invention, as now recited in claim 12, is directed to a stereoscopic display comprising: a left and right pair of projectors each including a light source array extending at least one-dimensionally or two-dimensionally for providing an input image composed by a luminous input flex emitted therefrom, an illumination lens through which the luminous input flex emitted from the light source array passes, a light valve formed and positioned relative to the illumination lens and the light source array to **pass (but not multiplex or diffract)** the luminous input flex passed through the illumination lens therein, and a projection lens for projecting the luminous input flex modulated at the light valve; and a screen for overlappingly displaying respective projected images composed by the respective luminous input flex projected by the respective projection lenses of each of the pair of the projectors, each of said projected images being a duplicate of the luminous input flux with a higher and more uniform luminance. The light valve of each of the projectors is located roughly at a focus point of the illumination lens.

Applicants respectfully contend that neither Fukushima nor the other references cited as being pertinent to the invention teaches or suggests “an input image generated by a light source array and passed via an illumination lens, a light valve located roughly at a focus point of the illumination lens, and a projection lens arranged on an optical path in line with a screen for displaying a projected image on the screen which is a duplicate of the luminous input flux with a higher and more uniform luminance” as in the present invention.

In contrast, the image projected on the F2 Fourier transform plane in Fukushima, i.e., the alleged screen, is **multiplexed** (col. 6, line 39) and **diffracted** (Fig. 4; col. 7, lines 7-9 “the input image 221 is distributed around one order of diffraction”) by the grating 222 (col.6, line 46) such that it is not a duplicate of the input image 221. As such, an additional lens element 331 is required to perform an inverse Fourier transformation (Abstract, last three lines) to correct the multiplexed and diffracted image on F2 into a reproduced image 341 on a reproducing plane F3 (Fig. 1) which is located behind the lens element 331. In other words, the reproduced image 341 is on a plane behind the screen (rather than on the screen as the invention).

Fukushima relates to an image converter, i.e., a *filter* (rather than a *display*) in which Fourier transform is optically performed (col. 1, lines 8-10). The multiplexing optical system in Fukushima performs a plurality of filtering operations simultaneously on an input image and obtaining a result of filtering process. In Fig. 3, three diffracted luminous rays at the outgoing side (right side) of the input image display device 22 are generated from one luminous ray at the incoming side (*left* side) of the input image display device 22. Fourier-transformed images are formed on the Fourier transform plane F2, using the Fourier transform lens 31. In particular, the luminous rays emitted from **each** of the points on the input image display device 22 are multiplexed to form images on **plural points** at the Fourier transform plane F2, which requires a coherent light source (col. 6, line 37), such as laser, to generate the diffraction. To use more than one light source, the lights from different sources have to pass via a respective condenser to provide parallel beams and avoid interference.

On the other hand, according to the present invention, an image is formed on a screen via the projection lens 104, based on an image passing via the light valve 103 such that the luminous rays from **each** of the points on the light valve 103 are focused on **one point** on the projection lens 104 then on the screen, which does not require a coherent light source thus a light source array extending at least one-dimensionally or two-dimensionally composed by a

plurality of Light Emitting Diodes (LED) or a fluorescent lamp (page 12, line 14) is sufficient, and no condenser is required.

With respect to claims 2-3 and 12-13 of the present invention, a condenser lens 121 is arranged between the light source 111 and the collimator lens 13 in Fukushima, which makes the distance from the light source 111 to the device 22 unlikely to be the same as the distance between the collimator lens 13 and the device 22, i.e., the light source 111 being located roughly at the opposite focus point of the illumination lens. Rather, Since the collimator lens 13 is a single lens, the focal distance on both sides of the lens 13 should be identical to each other. Therefore, the input image display device 22 is located over $\pm 25\%$ out of the focal distance in Fukushima (Fig. 3) rather than roughly at the opposite focus point of the illumination lens. Further more, since luminous rays from the light source 111 are modulated to parallel luminous rays at the right side of the collimator lens 13, the cross-point of the luminous rays between the collimator lens 13 and the condenser 121 is a focal point. In Fig. 3, a distance from the condenser 121 to the light source 111 is approximately twice as long as the distance between the condenser 121 and the focal point such that the deviation is clearly beyond the range of $\pm 25\%$.

The other references simply fail to compensate for Fukushima's deficiencies.

Secondly, the Examiner reliance upon the "common knowledge and common sense" of one skilled in the art to the motivation for combining the teachings in Fukushima and other references does not fulfill the agency's obligation to cite references to support its conclusions. Rather, the Examiner must provide the specific teaching of such a combination on the record to allow accountability.

To establish a prima facie case of obviousness, the Board must, inter alia, show "some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). "The motivation, suggestion or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved." Kotzab, 217 F.3d at 1370, 55 USPQ2d at 1317. Recently, in In re Lee, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002), we held that the Board's reliance on "common knowledge and

common sense” did not fulfill the agency’s obligation to cite references to support its conclusions. Id. at 1344, 61 USPQ2d at 1434. Instead, the Board must document its reasoning on the record to allow accountability. Id. at 1345, 61 USPQ2d at 1435.

See In re Thrift, 298 F.3d 1357.

Even if, *arguendo*, a person of ordinary skill were motivated to combine Fukushima with other references, such a combination would still fall short in fully meeting the Applicants’ claimed invention as set forth in claims 1 and 12 since, as discussed. Namely, there is no teaching of “an input image generated by a light source array, passed via an illumination lens, a light valve located roughly at a focus point of the illumination lens, and a projection lens arranged on an optical path in line with a screen for displaying a projected image on the screen which is a duplicate of the luminous input flux with a higher and more uniform luminance” in the prior art.

Applicants contend that Fukushima and its combinations with other references fail to teach or disclose each and every feature of the present invention as disclosed in independent claims 1 and 12. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

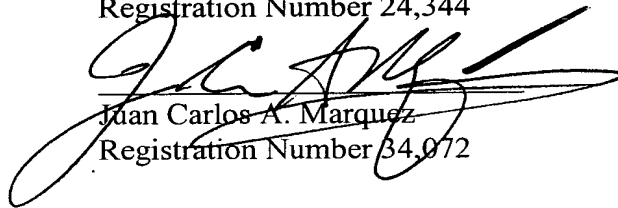
In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of

the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

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Marked-up Version of Amended Claims

1. A display comprising:
 - a projector including a light source array extending at least one-dimensionally or two-dimensionally for providing an input image composed by a luminous input flux emitted therefrom, an illumination lens through which [a] the luminous input flux emitted from the light source array passes, a light valve [for modulating] formed and positioned relative to the illumination lens and the light source array to pass the luminous input flux passed through the illumination lens therein, and a projection lens for projecting the luminous input flux modulated at the light valve; and
 - a screen for displaying a projected image composed by the luminous input flux projected by the projection lens of the projector, said projected image is a duplicate of the luminous input flux with a higher and more uniform luminance,
 - wherein the light valve of the projector [being] is located roughly at a focus point [f] of the illumination lens.
2. The display according to claim 1, wherein the light source array is located roughly at the opposite focus point of the illumination lens from the focus point on which the light valve is located.
3. The display according to claim 1, wherein the light valve is positioned [at] between the illumination lens and the focus point f of the illumination lens with a deviation in the range of +25 % away from the focus point [illumination lens].
4. [The] A display [according to claim 1,] comprising:
 - a projector including a light source extending at least one-dimensionally or two-dimensionally, an illumination lens through which a luminous input flux emitted from the light source passes, a light valve for modulating the luminous input flux passed through the illumination lens, and a projection lens for projecting the luminous input flux modulated at the light valve; and
 - a screen for displaying a projected image projected by the projection lens of the projector.

wherein the light valve of the projector is located roughly at a focus point of the illumination lens, and

wherein in the case where the area of the light source is large, satisfying the relationship of the following expression (7):

$$W > 1.2f/F_n \quad \cdots (7)$$

where F_n denotes the F-number of the projection lens, f denotes the focal length of the illumination lens, and W denotes the diameter of the light source, the light source is positioned at a distance in the range of from zero to 3.5 times the focal length f of the illumination lens away from the illumination lens.

5. [The] A display [according to claim 1,] comprising:

a projector including a light source extending at least one-dimensionally or two-dimensionally, an illumination lens through which a luminous input flux emitted from the light source passes, a light valve for modulating the luminous input flux passed through the illumination lens, and a projection lens for projecting the luminous input flux modulated at the light valve; and

a screen for displaying a projected image projected by the projection lens of the projector,

wherein the light valve of the projector is located roughly at a focus point of the illumination lens, and

wherein in the case where the area of the light source is small, satisfying the relationship of the following expression (8):

$$W \leq 1.2f/F_n \quad \cdots (8)$$

where F_n denotes the F-number of the projection lens, f denotes the focal length of the illumination lens, and W denotes the diameter of the light source, the light source is positioned at a distance of the focal length f of the illumination lens with a deviation in the range of from -40% to +80% away from the illumination lens.

6. The display according to claim 1, wherein the light source array comprises light-emitting diodes arranged in a one-dimensional or two-dimensional array.

7. [A] The display [comprising the projector] according to claim 1, [and a] wherein the screen [for causing] is formed to diffuse reflection thereon[of, and performing display of the projected image].

8. [The] A display [according to claim 2,] comprising:

a projector including a light source extending at least one-dimensionally or two-dimensionally, an illumination lens through which a luminous input flux emitted from the light source passes, a light valve for modulating the luminous input flux passed through the illumination lens, and a projection lens for projecting the luminous input flux modulated at the light valve; and

a screen for displaying a projected image projected by the projection lens of the projector,

wherein the light valve of the projector is located roughly at a focus point of the illumination lens,

wherein the light source is located roughly at the opposite focus point of the illumination lens from the focus point on which the light valve is located, and

wherein the following expression is satisfied:

$$\alpha H \geq \arctan (dH/2f) ,$$

where dH denotes the horizontal width of the light valve, f denotes the focal length of the illumination lens, and αH denotes the angle of radiation in the horizontal direction at each point of the light source.

9. [The] A display [according to claim 2,] comprising:

a projector including a light source extending at least one-dimensionally or two-dimensionally, an illumination lens through which a luminous input flux emitted from the light source passes, a light valve for modulating the luminous input flux passed through the illumination lens, and a projection lens for projecting the luminous input flux modulated at the light valve; and

a screen for displaying a projected image projected by the projection lens of the projector,

wherein the light valve of the projector is located roughly at a focus point of the illumination lens,

wherein the light source is located roughly at the opposite focus point of the illumination lens from the focus point on which the light valve is located, and

wherein the following expression is satisfied:

$$\alpha V \geq \arctan (dV/2f) ,$$

where dV denotes the vertical width of the light valve, f denotes the focal length of the illumination lens, and αV denotes the angle of radiation in the vertical direction at each point of the light source.

10. The display according to claim 2, wherein the light source array comprises light-emitting diodes arranged in a one-dimensional or two-dimensional array.
11. [A] The display [comprising the projector] according to claim 2, [and a] wherein the screen [for causing] is formed to diffuse reflection thereon[of, and performing display of the projected image].
12. A stereoscopic display comprising:
 - a left and right pair of projectors each including a light source array extending at least one-dimensionally or two-dimensionally for providing an input image composed by a luminous input flux emitted therefrom, an illumination lens through which [a] the luminous input flux emitted from the light source array passes, a light valve [for modulating] formed and positioned relative to the illumination lens and the light source array to pass the luminous input flux passed through the illumination lens therein, and a projection lens for projecting the luminous input flux modulated at the light valve; and
 - a screen for overlappingly displaying respective projected images composed by the respective luminous input flux projected by the respective projection lenses of each of the pair of the projectors [on the same panel], each of said projected images is a duplicate of the luminous input flux with a higher and more uniform luminance,
 - wherein the light valve of each of the projectors [being] is located roughly at a focus point [f] of the illumination lens.
13. The display according to claim 12, wherein the light valve is positioned [at] between the illumination lens and the focus point f of the illumination lens with a deviation in the

range of $\pm 25\%$ away from the focus point [illumination lens].

14. A stereoscopic [The] display [according to claim 12,] comprising:

a left and right pair of projectors each including a light source extending at least one-dimensionally or two-dimensionally, an illumination lens through which a luminous input flux emitted from the light source passes, a light valve for modulating the luminous input flux passed through the illumination lens, and a projection lens for projecting the luminous input flux modulated at the light valve; and

a screen for displaying respective projected images projected by the projection lenses of the pair of the projectors on the same panel,

wherein the light valve of each of the projectors is located roughly at a focus point of the illumination lens, and

wherein in the case where the area of the light source is large, satisfying the relationship of the following expression (7):

$$W > 1.2f/F_n \quad \cdots (7)$$

where F_n denotes the F-number of the projection lens, f denotes the focal length of the illumination lens, and W denotes the diameter of the light source, the light source is positioned at a distance in the range of from zero to 3.5 times the focal length f of the illumination lens away from the illumination lens.

15. A stereoscopic [The] display [according to claim 12,] comprising:

a left and right pair of projectors each including a light source extending at least one-dimensionally or two-dimensionally, an illumination lens through which a luminous input flux emitted from the light source passes, a light valve for modulating the luminous input flux passed through the illumination lens, and a projection lens for projecting the luminous input flux modulated at the light valve; and

a screen for displaying respective projected images projected by the projection lenses of the pair of the projectors on the same panel,

wherein the light valve of each of the projectors is located roughly at a focus point of the illumination lens, and

wherein in the case where the area of the light source is small, satisfying the relationship of the following expression (8):

$$W \leq 1.2f/F_n \quad \cdots (8)$$

where F_n denotes the F-number of the projection lens, f denotes the focal length of the illumination lens, and W denotes the diameter of the light source, the light source is positioned at a distance of the focal length f of the illumination lens with a deviation in the range of from -40% to +80% away from the illumination lens.

16. A stereoscopic [The] display [according to claim 12,] comprising:
a left and right pair of projectors each including a light source extending at least one-dimensionally or two-dimensionally, an illumination lens through which a luminous input flux emitted from the light source passes, a light valve for modulating the luminous input flux passed through the illumination lens, and a projection lens for projecting the luminous input flux modulated at the light valve; and
a screen for displaying respective projected images projected by the projection lenses of the pair of the projectors on the same panel,
wherein the light valve of each of the projectors is located roughly at a focus point of the illumination lens, and
wherein the following expression is satisfied:
 $\alpha \geq V \arctan (dV/2f) ,$
 where dV denotes the vertical width of the light valve, f denotes the focal length of the illumination lens, and αV denotes the angle of radiation in the vertical direction at each point of the light source.
17. [A] The display [comprising the projectors] according to claim 12, [and a] wherein the screen [for causing] is formed to diffuse reflection thereon[of, and performing display of the projected image].
18. The display according to claim 10, wherein the light-emitting diodes constituting the light source array are arranged at least in two or more different directions in combination.
19. A display comprising the projector according to claim 10, [and a] wherein the screen [for causing] is formed to diffuse reflection thereon[of, and performing display of the projected image].

20. A display comprising the projector according to claim 18, [and a] wherein the screen [for causing] is formed to diffuse reflection thereon[of, and performing display of the projected image].
21. The display according to claim 20, wherein the screen comprises a corner reflector, and an anisotropic diffusion means for causing wider diffusion in a direction parallel to [the] a ridgeline of the corner reflector than in [the] a vertical direction.